

A SURVEY ON THE BEETLE DIVERSITY OF LUMDING

JASHODEB ARJUN & RAJESH PAUL

Zoology Department, Lumding College, Lumding, 782447, Assam, India

ABSTRACT

*Insects dominate every major terrestrial biomass, out of which the order Coleoptera has the richest species diversity. Assam is undoubtedly the adobe of many flora and fauna. Lumding, a small part of Hojai district, Assam is a railway based town with rich reserve forests which are heavily populated with different types of plants, birds, insects and other lower and higher animals. In our previous works on Lumding, we have procured that this place is richly populated with different species of insects which motivated us to work more in the field of entomology and to search for other varieties of insects in Lumding. During our present investigation, efforts were made to explore the various types of beetles available in Lumding forest area. Along with identifying the beetle diversity we also tried to measure various bodily features and feeding habits of identified beetle species. About six species of beetles are found as *Phylotreta crucifera*, *Bagrada hillaries*, *Aristobia reticulata*, *Callosobruchus maculatus*, *Henosepilachna vigintioctopunctata*, and *Sternochotus mangifera*. Out of which about 90% were polyphagous during both larval and adult stages. Majority of the identified species were proven as a threat to agricultural products.*

KEYWORDS: Beetles, Insecta, Polyphagous, Phytophagous, Lumding & Coleopteran

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1. INTRODUCTION

Insects are considered among the best diversified group of organisms which play many important roles in the ecosystem. In animal kingdom, class insecta of phylum Arthropoda is the most species rich group of organism (Hazarika, and Kalita, 2018). The class Insecta dominates every major terrestrial biomass and is responsible for performing many ecological functions (Samways, 2005). Under class insecta, order coleoptera is rich in species and widespread in terrestrial and aquatic environment. Beetles are the group of insects which forms order Coleoptera. There are about 3,50,000 beetles described in reports (New, T., 2007) of which 1,50,000 are found in India (Kazmi and Rammurthi, 2004). These beetles are found in all natural habitats such as vegetative foliage trees and even inside plant like galls, tissue, including dead and decaying ones (Gullon and Crunston, 2010). Some beetles act as pest causing great damage to vegetation whereas some are beneficial as they help in pest control.

In India, about 25% of beetle species are polyphagous i.e. live on plants. As plants are most essential for all living organisms for their livelihood, so the beetles can be categorised as pests (Gilliot, 1995). Beetles feed on plants, break down plants and animal matter. On the other hand, some beetles are beneficial as they are able to control population of pest e.g. aphids, scale insects, mealy bugs are consumed by ladybird beetle. Similarly, some ground beetles are the common predators of many different insects, caterpillars, wire worms, etc. (Kromp, 1999;). The dung beetles of family scarabidae help in reducing the population of pestilent flies and parasitic worms as well as functionally are important constituents of terrestrial ecosystem (Kakkar and Gupta, 2019).

Assam is enriched with a huge variety of flora and fauna and our current site of survey Lumding forest is heavily decorated with greenery as well as uncountable number of higher and lower animals. Hence, we decided to explore the different insect populated areas of Lumding and to measure their abundance over there. We also planned to study the bodily features, size, feeding habits, behavioural aspects, economic importance and other special features of the identified beetles and were optimistic to attain some new facts about beetles of Lumding which will motivate other scientists to work further.

2. MATERIALS AND METHODOLOGY

2.1. Study Area

The rural area of Lumding is located about 3.5 km from Lumding railway station. It lies in between the geographical location of 25°75' N latitude and 93°17' E longitude and 125m above sea level. The vegetation type found in the area are mixed moist deciduous forest, semi evergreen forest and scattered deciduous forest. Degraded and shrub type of forest are also found here. The village harbors varied natural habitats ranging from grassland, forest and few small and medium sized ponds. The average rainfall is around 2800 mm. The temperature varies from 9°C to 19°C in winter and 25° up to 38°C in summer and relative humidity ranges from 47% to 82%. The survey was carried out at four different sites as follows,

- **Site 1)** Forest area,
- **Site 2)** Paddy land area,
- **Site 3)** Vegetable land area, &
- **Site 4)** Garden area.

2.2 Survey Time

The present study was conducted from March to May 2019. The collection of beetle was executed during morning hours from 6.00 a.m to 11 a.m and evening from 3.30 pm to 6 pm.

Various materials like camera, copy, pencil, chloroform containing plastic container, test tubes were taken along during survey. The beetles were collected mainly by handpicking method in test tubes. Butterfly nets were used for catching flying beetles. Some beetles were collected during nighttime with the help of white light source. The collected beetles were kept in chloroform container. The specimen were then photographed using specialised cameras for identification.

2.3 Identification

The identification of the species was done with the help taxonomic keys (Hern,1905; Gahan,1996; Jacoby,1998; Mandolik,1996; Cameron, 1930; Maulik,1999, Chandra,2011).

3. RESULTS AND DISCUSSIONS

Table 1: Identification of Beetle Species

Serial No.	Name of Family	Name of Genus	Name of Species
1	Chrysomelidae	<i>Phyllotreta</i>	<i>Phyllotreta crucifera</i>
2	Pentatomelidae	<i>Bagrada</i>	<i>Bagrada hillaries</i>
3	Chrysomelidae	<i>Callosobruchus</i>	<i>Callosobruchus maculatus</i>
4	Cerambycidae	<i>Aristobia</i>	<i>Aristobia reticulata</i>

Table 1: Contd.,			
5	Coccinellidae	<i>Hanosepilachina</i>	<i>Henosepilachna vigintioctopunctata</i>
6	Curculionidae	<i>Sternochotus</i>	<i>Sternochotus mangifera</i>

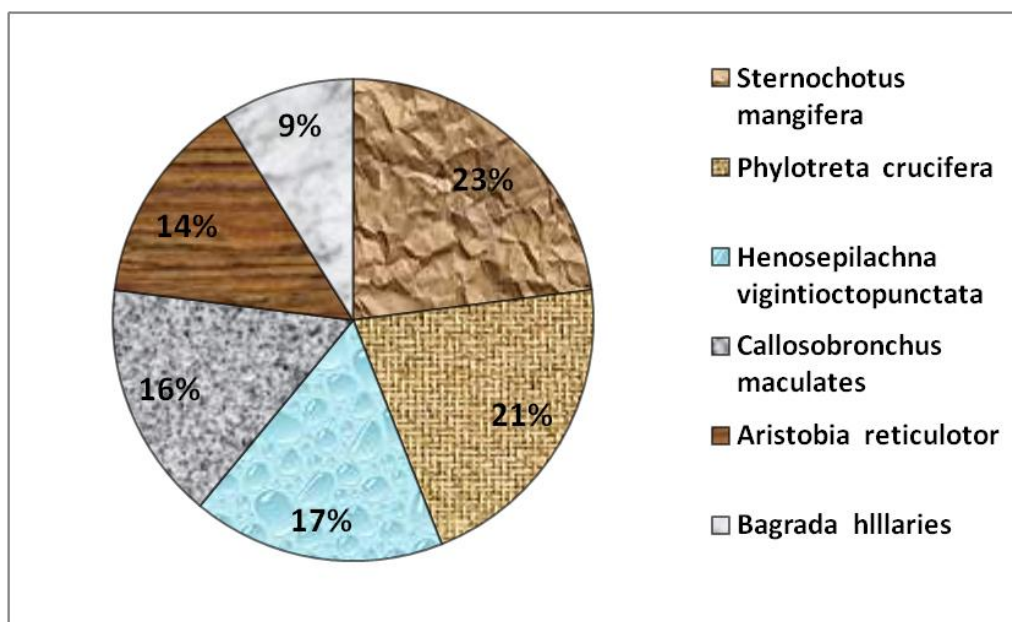


Figure 1: Graphical Representation of Beetle Diversity in Lunding.

Table 2: Identified Beetles with their Feeding Habits

Serial No.	Name of Species	Feeding Habits
1	<i>Phylotreta crucifera</i>	Polyphagous
2	<i>Bagrada hllaries</i>	Polyphagous
3	<i>Callosobronchus maculatus</i>	Polyphagous
4	<i>Aristobia reticulotor</i>	Polyphagous
5	<i>Henosepilachna vigintioctopunctata</i>	Polyphagous
6	<i>Sternochotus mangifera</i>	Monophagous

Table 3: Comparative Study of Physiological Features of Identified Beetles

Serial No.	Name of Species	Special Characteristics	Body Structure	Body Colour	Host Plants	Economic Importance
1	<i>Phylotreta crucifera</i>	Greatly enlarged hind femora	3m.m long	Shiny blackish with green blue hues	Cabbage Radish	Serious pests of seedling causes retarded growth.
2	<i>Bagrada hllaries</i>	Shield shaped body	5-7m.m long	Black with white & orange marking	Crucifera crops	Damage crucifera crops.
3	<i>Callosobruchus maculatus</i>	Grey elytra With central black spot	3-4.5 m.m long	Reddish brown with black spot	Beans	Damage to lentil, reduced germination capacity.

4	<i>Aristobia reticulator</i>	Tuft of hair on apices of 3 rd , 4 th , & 5 th segments	20.97-26.34m.m long	Black body with white spot	Litchi & Guava	A trunk borer pest causing great damage.
5	<i>Henosepilachna vigintioctopunctata</i>	Elytra is covered with 28 spots	7-10 m.m long	28 black spot on yellow elytra	Brinjal, potato & Pumpkin	Great damage to family solanaceae.
6	<i>Sternochotus mangifera</i>	Adult press legs to the body if disturbed	7.5-9.5 long	Black grayish or yellowish scales	Mango seed	Infect mango seed causing threat to mango production.

Our investigation exhibited six species of beetles belonging to six genera and five families. Among these six species, five were polyphagous where as only one is monophagous. Beetles are in general phytophagous & shows monophagy and oligophagy also(Raju *et al.*, 2016).

The only one monophagous species identified was i.e. *Sternochotus mangifera*. The families Chrysomelidae, Pentatomelidae, Chrysomelidae, pentatomidae, Cerambicidae, Coccinellidae are polyphagous. The beetle identified under family Curculionidae is monophagous. Insects which are primarily agricultural pests and feed on economically important agricultural and horticultural plants which have wide taxonomic diversity are considered as polyphagous pests. They are harmful to crops prior to their voracious food habits. In the case of polyphagous beetles, there is a lot of scope for adaptation & survival according to seasonal variation (Slogett & Magerus, 2000). Though the present study reported different bodily features and feeding habit but extensive study is required on various aspect of beetles such as seasonal variation and inter specific relation among the species.

Monophagous insects are those insects, who feed on only one species of plant. It is to be noted that, the monophagous beetles do not have adaptive benefits due to their restricted feeding to only one plant. In the absence of their particular host plant, they do not survive and finally disappear. The feeding activities of beetles indicate that they have important role in maintaining the balance of ecosystem (Patel, 2015). In this study, highest number of beetle species were found polyphagous which may be prior to the rich vegetation of Lumding Reserve forest. In case of monophagous beetles, there is little or no scope for adaptation and survival in the habitat (Pathania *et al.*, 2015). As the host plants of monophagous beetle ranges from one to few and they are not available in the particular habitat, the beetles are found to leave the habitat in search of food in other places or may have to face death (Koli *et al.*, 2014). But in case of monophagous beetles, there is less scope for adaption and survival in the habitat as they may get certainly one or more host plant at any time of the year in the habitat (Ditchkoff, 2016). Whereas in case of polyphagous beetles, there is a lot of scope for adaptation & survival due to seasonal variation (Slogott & Magerus, 2000).

4. CONCLUSIONS

Our initiative to explore the beetle abundance in Lumding forest reserve was a noteworthy one as we received healthy varieties of beetle species. Our study also revealed different bodily features and feeding habits but still, we believe that extensive study is required on various aspects of this matter such as seasonal variation and interspecific relation among the species. Hence, we are hopeful that we will get back to this topic once again and will explore new interesting facts about beetles of Lumding.

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